

Identification: The gram pod-caterpillar or gram pod-borer is a serious pest of gram and red gram. The moth is stoutly built and is yellowish brown. Caterpillars are greenish with dark broken grey lines along the sides of the body.

Life cycle: The females lay about 500 – 750 eggs on tender parts of the plants. The eggs hatch in one week. Larvae come out and move from pod to pod and are full fed in 3 weeks. The full grown larvae come out of the pods and pupate in soil for 2 weeks which prolongs in winter. There may be 8 generations in a year.

Damage: Larvae feed on the foliage when young and on the seed in later stages. A single larva may destroy 30-40 pods before it reaches maturity.

Control:

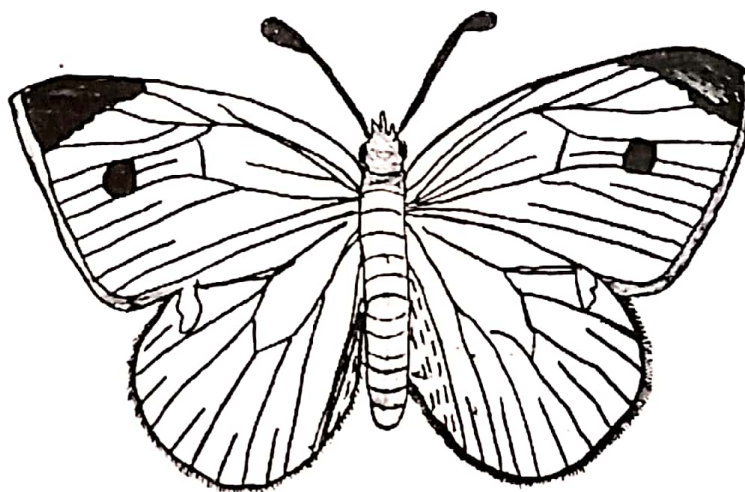
- The pest can be suppressed by hand picking the caterpillars in the early stages of the attack.
- Ichneumonid wasp, larval parasitoid of gram pod-borer should be promoted in the field.
- Spray profenofos EC 800 ml/acre or lambda cyhalothrin EC 250 ml/acre.

4.6 INSECT PESTS OF VEGETABLES

4.6.1 CABBAGE BUTTERFLY

T.N: *Pieris brassicae*

(Pieridae; Lepidoptera)



Identification: Large, body blackish, wings yellowish white with a black patch on apical angle of each forewing. Female bears two black spots on the upper side of each forewing. Larvae are pale yellow or greenish yellow.

Life cycle: Female lays eggs in clusters on under sides of leaves. The eggs hatch in 2 weeks. Larvae period lasts for 3 weeks and pupal period is for 2 weeks. This insect pest lives in hills during summer and in plains during winter.

Damage: The larvae feed and damage the leaves by making big holes in them and hence reducing the photosynthetic area of the plant.

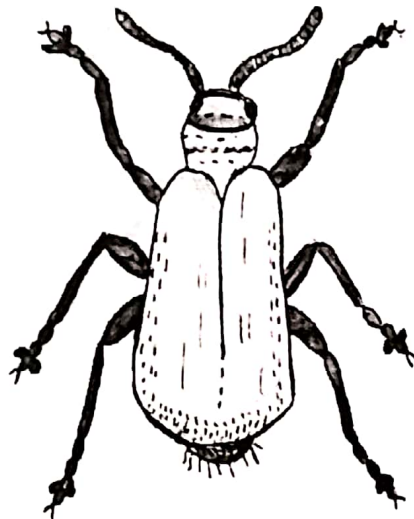
Control:

- Collection and destruction of egg clusters and larvae.
- Catch adults by hand nets.
- *Apantelese* spp. is a larval parasitoid of cabbage butterfly.
- Spray lufenuron EC 200 ml/acre or spinosad SC 80 ml/acre.

4.6.2 RED PUMPKIN BEETLE

T.N: *Aulacophora foveicollis*

(Chrysomelidae; Coleoptera)



Identification: Larvae are creamy white, with a slightly darker oval shield at the back. The adult beetles are oblong. Their dorsal body surface is orange red and the ventral surface is black. Short white hairs are present on the body.

Life cycle: The beetles lay about 300 oval yellow eggs singly or in batches of 8-10 in moist soil near the base of the plants. The eggs hatch in 2 weeks. The grubs, are full grown in 4 weeks and pupate in thick-walled earthen chambers in the soil. The pupal stage lasts for 3 weeks and the beetles on emergence begin to feed and breed.

Damage: The beetles are very destructive to cucurbitaceous vegetables, particularly during March-April when the creepers are very young. The grubs damage the plants by boring into the roots, underground stems and sometime into the fruits touching the soil. The beetles injure the cotyledons, the flowers and the foliage by biting holes into them.

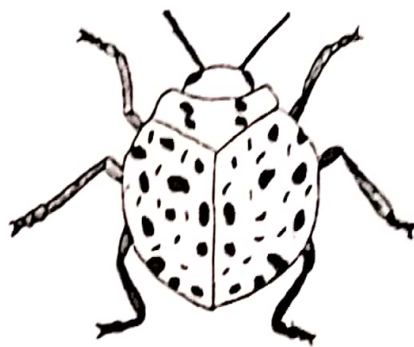
Control:

- Deep ploughing to kill grubs in the soil.
- To avoid its attack sowing of crop may be done in November.
- Dusting the plants with ash temporarily repels the beetles.
- Dusting the crop with 5% pyrethrum when there is no dew on the plants.
- Light dusting with BHC 2.5% is also effective against beetles and has no adverse effect on plants.
- Spraying the crop with methyl parathion/dimethoate 0.02% or malathion 0.05% also controls the pest.

4.6.3 HADDA BEETLE

T.N: *Epilachna dodecastigma*

(Coccinellidae; Coleoptera)



Two species of hadda beetles, viz. *Epilachna duodecastigma* and *E. vigintioctopunctata*, attack different solanaceous vegetables like brinjal, tomato and potato. Another species, *E. demurili*, attacks cucurbitaceous vegetables exclusively.

Identification: *Epilachna vigintioctopunctata* beetles are deep red and usually have 7-14 black spots on each elytron whose tip is somewhat pointed. Beetles of *E. dodecastigma* are deep copper-coloured and have six black spots on each elytron whose tip is more rounded. The *E. demurili* beetles have a dull appearance and are

light copper-coloured. Each of their elytra bears six black spots which are surrounded by yellowish rings. All the three species have yellowish grubs.

Life cycle: The life cycle and the mode of damage of the three species of hadda beetles are very similar. It passes the winter as a hibernating adult among heaps of dry plants or in cracks and crevices in the soil. It resumes activity during March-April and lays yellow cigar-shaped eggs, mostly on the underside of leaves, in batches of 5-40 each. A single female can lay up to 400 eggs in her lifetime. The grubs feed on the lower epidermis of the leaves and are full-grown in 3 weeks. The pupae are darker and are found fixed on the leaves, stems and most commonly at the base of the plants. The pupal stage lasts for 2 weeks. There are 7 generations in a year.

Damage: Both the adults and the grubs damage by feeding on the upper surface of the leaves. They eat up regular areas of the leaf tissue, leaving parallel bands of uneaten tissue in between. The leaves, thus, present a lace-like appearance. They turn brown, dry up and fall off, completely defoliating the plants.



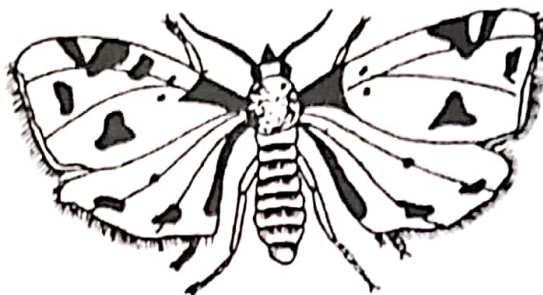
Control:

- Grow resistant varieties.
- Destruction of attacked plants or plant parts.
- Hadda beetles can be controlled by using diazinon 0.02% or malathion 0.05%.

4.6.4 BRINJAL FRUIT BORER

T.N: *Leucinodes orbonalis*

(Pyralidae; Lepidoptera)



Identification: Caterpillars are creamy white, when young but become light pink when full-grown. The moth is white with black spots on the dorsum of thorax and abdomen. Its fore wing has black or brown spots and both wings fringed with bristles.

Life cycle: The caterpillars hibernate in the winter and pupate early in the spring. The moths lay 50-100 creamy white eggs, singly or in batches of 2-4 on the underside of leaves, flower buds, green stems or fruits. The eggs hatch in one week and the larvae grow through 5 stages and are full fed in 4 weeks. The larvae pupate in tough silken cocoon among the fallen leaves. The pupal stage lasts 3 weeks and the life-cycle is completed in 6 weeks during the active season. There are 5 overlapping generations in a year.

Damage: Young caterpillars bore into tender shoots near the growing points into the flower buds or into the fruits. When the terminal shoots are attacked, the growing points are killed. Damage to the fruits, particularly in the autumn is very severe.

Control:

- Removal and destruction of damaged fruits, fallen leaves and shoots.
- Deep ploughing should be done to destroy different pest stages in the soil.
- Avoid continuous sowing and rationing of brinjal crop.
- *Bracon* spp. is an important parasitoid of this pest.
- Spray the crop with emamectin benzoate 200 gram/acre.

4.6.5 BRINJAL STEM BORER

T.N: *Euzophera perticella*

(Pyralidae; Lepidoptera)

Identification: The caterpillars are creamy white and have a few bristly hairs and their body tapers posteriorly. The moths have pale-yellow abdomen. The head and the thorax are greyish. The fore wings are pale straw yellow and the hind wings are whitish.

Life cycle: The pest is active from March to October. The moths lay cream colored scale like eggs singly or in batches. A single female may lay 100-200 eggs in its life span of about a week. The eggs hatch in one week. They pass through 4 or 5 stages and are full-fed in 8 weeks. After pupation, they transform themselves into adults in one week. The life cycle is completed in 11 weeks and the pest has 5-6 overlapping generations in a year.

Damage: The young larvae feed for a few minutes on exposed plant parts and then bore into the shoot by making longitudinal tunnels. The caterpillars feed exclusively in the main stem and have never been observed to bore into the fruits. As a result of their attack in the field, plants are seen withering and drying up.

Control:

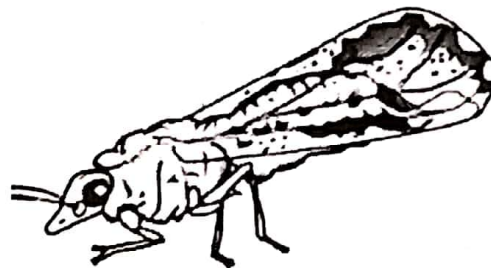
- The withered plants should be uprooted and burned.
- When the attack of this borer is serious, avoid rationing of brinjal crop.
- Spray the crop with emamectin benzoate 200 gram/acre or cypermethrin EC 200-250 ml/acre.

4.7 INSECT PESTS OF FRUITS

4.7.1 CITRUS PSYLLA

T.N: *Diaphorina citri*

(Psyllidae; Homoptera)



Identification: The insect is brown with its pointed head. The nymphs are flat, louse like and orange yellow, congregates in large numbers on the young leaves and the buds.

Life cycle: The adults lay 500 almond-shaped, orange and stalked eggs on tender leaves and shoots of citrus trees. The eggs are laid either singly or in groups which